Description

Arrangement for generating service-oriented call-charge data in a communication network

The present invention relates to an arrangement for generating service-oriented call-charge data for at least one service in a communication network. The arrangement comprises in at least one first domain, a so-called charge metering domain, network elements for charge metering, called charge metering points in the text that follows, and in at least a second domain, a so-called charging domain, network elements for charging, called charging points in the text which follows.

Charge metering for services in communication networks has hitherto been based on a largely independent and unsynchronized metering of a resource utilization, required for the service, by the network elements involved in the performance or production of the service. Following the utilization, resultant or collected or metered call-charge data are collected in network elements provided for this purpose for generating a service-oriented bill. In a so-called pre-paid method, the charge metering described must take place during the resource utilization.

To be able to perform the charge metering described, all network elements involved in the charge metering must have an unambiguous correlation identifier. This correlation identifier unambiguously identifies all call-charge records which belong to a performance of an actual service and must, therefore, be entered in the call-charge records

so that these can be centrally correlated with one another.

One of the central problems of the correlation-based charge metering described is the distribution of the correlation identifier to all network elements involved which has to be performed. The network elements can operate on different network layers such as, for example, on a so-called layer 2, 3 or 7 and at the same time also in various network domains such as, for example, in a so-called PS domain (packet switched) or in a so-called IMS (IP multimedia subsystem). It is also conceivable that the network elements involved in the performance of a service are also separate from one another due to technology boundaries. Thus, the network elements can be based, for example on UMTS (universal mobile telecommunications system) or WLAN (wireless local area network). In such a heterogeneous environment, a mechanism for distributing the correlation identifier must be defined and subsequently standardized for each new service. Due to this procedure, a rapid and flexible introduction of new services is not guaranteed. Due to the problem presented, it was not possible, for a long time, to offer the so-called MMS (multi media service) for pre-paid subscribers due to a lack of charging methods. The complexity already existing in the charge metering is increased with the new distributed network architectures, in such a manner that charge metering by means of the present methods described will no longer be controllable in future.

The inefficiency of the existing methods represents a further problem. Hitherto, call-charge data are collected in all network elements involved and the resultant charge

records forwarded to a central place. This central place must
find the call charge records belonging together out of a flood
of data. Following this, the important call-charge records are
evaluated and the remaining records are discarded.

It was an object of the present invention to provide an
arrangement with the aid of which it becomes possible to
generate service-oriented call-charge data for a service in a
communication network as simply, efficiently and rapidly as
possible.

This object is achieved by an arrangement according to the
invention according to claim 1. Further advantageous
embodiments of the arrangement according to the invention will
be listed in the subclaims.

According to claim 1, an arrangement for generating
service-oriented call-charge data is provided for at least one
service in a communication network, the arrangement having in
at least one first domain, a so-called charge metering domain,
network elements for charge metering, called charge metering
points in the text which follows, and in at least one second
domain, a so-called charging domain, network elements for
charging, called charging points in the text which follows. The
arrangement is characterized by the fact that the arrangement
comprises a policy function which controls both the charge
metering points and the charging points by using predefined
rules. For this purpose, the policy function distributes rules
to individual charging processes, that is to say to individual
metering and charging processes. Within the scope of the
present invention, a charging is understood to be

a function implemented in a charge metering point or a charging
point. Controlling includes the switching-on and -off of call-
charge processes, and instructions as to which data are to be
metered and how the metered data are to be processed.

In a particularly preferred embodiment of the arrangement
according to the invention, the policy function controls all
charge metering points comprised in the arrangement. In
contrast, the policy function defined in 3GPP, the so-called
policy decision function (PDF) only controls one access network
node, namely a GGSN (gateway GPRS support node) in the GPRS
communication network for the local control of resource
allocations. Furthermore, controlling charging points is
generally not provided in 3 GPP. Charging points are, for
example, collection functions and correlation functions,
so-called tariffing functions, credit or debit monitoring
functions and account management functions. In addition, these
can also be service and/or access authorization functions.

The policy function of the arrangement according to the
invention is preferably designed in such a manner that the
policy function controls all charging processes of the at least
one service. Charging processes of different services are in
each case preferably controlled separately for each service of
the policy function. In this preferred embodiment of the
arrangement according to the invention, the policy function,
has access to subscriber data, service data and tariff data.

In a further preferred embodiment of the arrangement according
to the invention, the policy function is designed in such a
manner that it can control a charge metering relating to the
service,

taking place simultaneously during the performance of the at least one service.

In addition, the policy function can preferably also control a simultaneous monitoring of predefined call-charge thresholds relating to the service.

In another preferred embodiment of the arrangement according to the invention, the policy function has an interface to a service computer producing the at least one service. Via this interface, an interactive control can be effected.

Furthermore, it is conceivable within the scope of the present invention that the policy function has one interface each to the network elements to be controlled, via which the rules applied for controlling are in each case distributed. This means that each network element to be controlled is directly contacted by the policy function or controlled by using corresponding rules.

In another preferred embodiment of the arrangement according to the invention, the policy function has an interface for forwarding the rules used for controlling to one of the network elements to be controlled from where they are forwarded to the remaining network elements to be controlled. This means that the rules are progressively forwarded from network element to network element.

The arrangement according to the invention provides for a centralized and, at the same time, dynamic control of call-charge processes during the utilization of a service in a communication network. The policy function provided according to the invention in the

arrangement according to the invention has rules by means of which control is to be effected and can conduct these to corresponding charge metering and charging points. Due to the centralized position of the policy function, simple and efficient control is possible.

Further advantages of the arrangement according to the invention will be explained in greater detail with reference to the following figure, in which

figure 1 shows a diagrammatic representation of an embodiment of an arrangement according to the invention.

Figure 1 shows an arrangement which comprises various domains of a communication network. Two charging domains 1 and 2 and two charge metering domains 1 and 2 of a communication network are shown. A service is to be produced, in the performance of which for a user UF (user function), a number of domains of the communication network are involved. This means, for example, that data for producing the service are transmitted via a number of network elements in which so-called metering points (MP) are in each case implemented. Furthermore, a policy function RF is provided which can intervene in a controlling manner on both types of domains which is supposed to be made clear from the arrows printed in bold and the expression "charging rules". The individual metering points (MPs – i.e.: MPn … MP 1) of the service can be controlled by the policy function RF in such a manner that they either meter data or do not. Metering and storage of data takes place on call-charge data records, so-called CDRs – charging data records. Furthermore, they are notified by the policy function about the places, to which the results, that is to say the CDRs, are to be transmitted. The CDRs are, ,

as a result collected in a specific collection function arranged in the respective charge metering domain and stored on a so-called master charging data record (MCDR), that is to say in a type of combination of a number of CDRs and forwarded by the collection function to an accounting function which is located in a charging domain allocated to the respective charge metering domain. If then a number of accounting functions are involved due to a scenario extending over a number of domains, these accounting functions must perform inter-domain signaling for exchanging and processing the collected data or CDRs.